

CLAIMS

1. Optical mode adapter, comprising first (C1) and second (C2) channels on an optical substrate (31) designed for connection of first and second waveguides respectively to its first (11) and second (12) ends,  
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characterised in that said two channels being covered with at least one guide layer (33), the refractive index of the first channel (C1) is lower than that of the second channel (C2).

10 2. Adapter according to claim 1, characterised in that the width of the first channel (C1) is higher than that of the second channel (C2).

15 3. Adapter according to claim 1 or 2, characterised in that it comprises an adaptation cell (2) in which the two channels (C1, C2) are in contact, the first (21) and second (22) ends of this cell, respectively, being disposed near the first (11) and second (12) ends of the adapter, respectively, the width of the first channel (C1) decreasing from the first end (21) to the second end  
20 (22) of said adaptation cell.

4. Adapter according to claim 3, characterised in that the width of the first channel (C1) is zero at the second end (22) of said adaptation cell.

25 5. Adapter according to claim 1 or 2, characterised in that it comprises an adaptation cell 2 in which the two channels (C1, C2) are in contact, the first (21) and second (22) ends of this cell, respectively, being disposed near the first (11) and second (12) ends of the adapter, respectively, the width of the second channel (C2) decreasing from the second end (22) to the first end (21) of said adaptation cell.  
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6. Adapter according to claim 5, characterised in that the width of the second channel (C2) is zero at the first end (21) of said adaptation cell.

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7. Adapter according to any of the claims 3 to 6, characterised in that the second end (22) of said adaptation cell coincides with the second end (12) of said adapter.

5 8. Adapter according to any of the previous claims, characterised in that the index of this guide layer (33) is higher than that of the substrate (31).

10 9. Adapter according to any of the preceding claims, characterised in that it comprises at least one covering layer (34) disposed on said guide layer (33), the index of this covering layer being lower than that of the guide layer and that of said channels (C1, C2).

15 10. Adapter according to any of the preceding claims, characterised in that at least one of said channels (C1, C2) is integrated in said substrate (31).

11. Adapter according to any of the claims 1 to 9, characterised in that at least one of said channels (C1, C2) projects on said substrate (31).

20 12. Adapter according to any of the preceding claims, characterised in that the index of said guide layer (33) is equivalent to that of the substrate (31) multiplied by a factor higher than 1,001.

25 13. Adapter according to any of the preceding claims, characterised in that the thickness of the whole of the guide layers (33) is between 1 and 20 microns.

14. Adapter according to any of the preceding claims, characterised in that at least one of said channels (C1, C2) results from an ion implantation in said substrate (31).

30 15. Method for marking an adapter according to any of the claims 1 to 13, characterised in that it includes the following steps:

- implementation of a mask on said substrate (31) to define the M-shaped pattern of at least one of 35 said channels (C1, C2),

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- ion implantation of the masked substrate,
- withdrawal of said mask,
- deposition of said guide layer (33) on the substrate.

5 16 Method for making an adapter according to any of the claims 1 to 13, characterised in that it includes the following steps:

- ion implantation of the substrate (31),
- implementation of a mask on said substrate
- 10 to define the M-shaped pattern of at least one of said channels (C1, C2),
  - etching of the substrate (31) in a depth at least equal to the depth of implantation,
  - withdrawal of said mask,
- 15 - deposition of said guide layer (33) on the substrate.

17. Method according to claim 15 or 16, characterised in that it includes a step of annealing of the substrate (31) which follows the ion implantation step.

20 18. Method for making an adapter according to any of the claims 1 to 13, characterised in that it includes the following steps:

- implementation of a mask on said substrate (31) comprising moving ions to define the M-shaped pattern of at least one of said channels (C1, C2),
- 25 - dipping of the masked substrate in a bath comprising polarizable ions,
- withdrawal of said mask,
- deposition of said guide layer (33) on the

30 substrate.

19. Method for making an adapter according to any of the claims 1 to 13, characterised in that it includes the following steps:

- deposition of a first layer (61) of higher refractive index than that of said substrate (31),

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- implementation of a first mask on this substrate (31) to define the said first channel (C1),
- etching of the substrate (31),
- withdrawal of said first mask,
- 5 - deposition of a second layer (62),
- implementation of a second mask on this substrate (31) to define the said second channel (C2),
- etching of the substrate (31),
- withdrawal of said second mask,
- 10 - deposition of said guide layer (33) on the substrate.

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